

The Institution of Engineers, Australia; Sydney Division
Engineering Heritage Committee

ORAL HISTORY PROGRAM

INTERVIEWEE : Corbet Gore

TAPE NUMBERS :

IEA SYD: FH58

IEA SYD: FH59

IEA SYD: FH60

INTERVIEWER : Frank Heimans

INTERVIEW DATE : 29 August 2002 **NUMBER OF TAPES :** 3

RESTRICTION ON USE : None

INTERVIEW TAPE LOG

This interview took place at on 29 August, 2002.

This Log was prepared using a SONY TCM-5000 Cassette recorder

This interview is part of the Oral History Project of the Engineering Heritage Committee
of the Sydney Division the Institution of Engineers, Australia.

INTERVIEW TAPE LOG

Tape: IEA:SYD-FH58 Side A

TAPE COUNTER	SUBJECT	NAMES & KEYWORDS
002	Tape Identification	
007	Birth details (Born 1921 at Goondiwindi). Description of Goondiwindi and its pastoral industry.	1921 Goondiwindi
021	Secondary education: boarded at Church of England Grammar School, East Brisbane	Church of England Grammar School, East Brisbane
026	Father's family were pioneer settlers from Ireland who were granted a pastoral lease in Darling Downs. His great grandmother was the first white woman to raise a family on the Darling Downs. Great grandfather and his family bought sheep from Macarthur and drove them from Parramatta to the Darling Downs.	Darling Downs Ireland 1832 John Oxley John Macarthur
054	How the family came to settle in Goondiwindi.	Glen Innes Margareta Gunn Clairbough Kalandoon
076	Background of his mother's family. Her grandfather was a Scottish carpenter who became a gold digger and builder of timber mine shafts in Australia. He eventually became Mayor of Rockhampton.	Rockhampton John Ferguson Edinburgh, Scotland Gold fields Mudgee
123	Grandfather Gore started a stock and station agency in Goondiwindi.	
131	Was taught carpentry and leather work at primary school. The Great Depression affected the family financially.	Great Depression
151	Remembers his time at Church of England Grammar School. Would come home to Goondiwindi during holidays by steam train.	Kevin Morris (Headmaster at C of E Grammar School)
179	The Depression affected graziers and business. Neighbours would share food.	

196	Matriculated in 1937 and again in 1938. Went to Queensland University to study Civil Engineering in 1939. Does not consider himself to be much of a scholar. Joined an Engineer's Company in the Militia.	Queensland University St Johns College
238	Was called up in December 1939 by the RAAF. War interrupted his studies during second year at University.	RAAF Moreton Island
307	Describes his years with the RAAF in Coastal Command, as a bomber / navigator in Sunderland flying boats, bombing U-Boats. The British Navy was reluctant to admit that the RAAF had bombed U-Boats. Details of bombing sorties - flew 65 missions. Was stationed at Plymouth Air Base for a year from May 1942 and elsewhere until 1945.	Bay of Biscay U-Boats No. 10 Squadron Plymouth
393	After the war in Europe ended, flew from Townsville to New Guinea, bringing soldiers back to Australia.	Townsville New Guinea
412	Was navigator on an aircraft flown from Plymouth to Australia at the end of the war in Europe.	Morocco Bathurst Brazil Puerto Rico Banana River Corpus Christi San Diego San Francisco
441	End of Tape IEA:SYD-FH 58 Side A	

Tape: IEA:SYD-FH58 Side B

00:06	Tape identification	
00:10	Was left in San Francisco for six months when he contracted mumps. Was discharged from the Air Force on Anzac Day, 1945.	Liberator (aircraft) Honolulu Nadi Amberley Air Base
028	Recommended his Civil Engineering degree at the University of Sydney. Feels that the interruption to his studies had a debilitating effect on his engineering career, not having had proper foundations.	Charlie Gray (lecturer)
058	For practical work in third year, spent three months working on the Iron Cove Bridge, then being constructed by Hornibrook. Was offered a job on the new oil refinery being built at Matraville after graduation at a starting salary of £4 per week in 1947. Was put in charge of the project as Site Engineer.	Sir Manuel Hornibrook Matraville
096	Challenges of the Matraville oil refinery project.	Shell Oil Company
130	He and a friend climbed the Storey Bridge in Brisbane one night.	Storey Bridge, Brisbane
137	Was posted to Wollongong as Engineer of Hornibrook's Port Kembla Branch. Designed and fabricated a helmet for pile driving, which shattered on first use. Was at Port Kembla until 1950. Built a rolling mill there.	Wollongong Clarrie McKenzie 'Drop Monkey' Essington Lewis Commonwealth Rolling Mills
189	After Port Kembla, was sent to New Guinea to head up a Hornibrooks venture. Auction of war surplus goods at Milne Bay. Started from scratch and ran the whole venture himself. Built the wharf at Port Moresby. Problems because of lack of supplies. Built an airstrip on an island and a 2000-ft long timber bridge across the Markham River. Difficulties in building the bridge.	George Noe Port Moresby Milne Bay Loneragan Dawson's Strip Markham River
2366	Met his wife and married in Port Moresby in 1956. Adopted three children.	
398	Left New Guinea in 1959.	
410	End of Tape IEA SYD:FH58 Side B	

Tape: IEA:SYD-FH59 Side A

001	Tape identification	
005	Rejoined Hornibrooks NSW Division in 1959 and was put in charge of setting up the Woomera Rocket Launching Ramp project.	Hornibrook Constructions Woomera Blue Streak Rocket Lake Hart
072	Was still responsible for New Guinea operations and travelled often to New Guinea.	
079	Next project was the construction of the Kings Avenue Bridge, Canberra, a concrete pre-stressed structure with tensioned beams.	Kings Avenue Bridge, Canberra Lake Burley Griffin
102	Also constructed the Commonwealth Avenue Bridge in Canberra. Used sand jacks, built from steel. Did not finish that job because the Opera House job came up.	Commonwealth Avenue Bridge, Canberra. Sand jacks
142	Opera House was a challenge. Was sent to London in 1962 to Arups. Utzon had done no detailed drawings, which were done by Arups. Was Chief Construction Engineer of Stage II of the Opera House.	Ove Arup and partners (London) Joern Utzon Copenhagen Michelangelo Christopher Wren
198	Civil and Civic had completed Stage I. Some of Stage I was inadequate and had to be dismantled. Believes that Utzon is now involved in changes to the building, which involves removing the main tie beam that takes the horizontal thrust.	Civil and Civic Constructions
229	When he arrived in London, Arups were trying to fit mathematical formulas to the freehand sketches by Utzon of the shells. Utzon then changed to his spherical design. Controversy about who thought of the spherical solution, but attributes it mainly to Utzon. Met Utzon, who instructed him to have no blemishes on the concrete and to achieve uniformity in colour and texture in the concrete.	Spherical design of shells.
351	Was apprehensive about doing the job to Utzon's very strict specifications. Wondered what he, the boy from Goondiwindi was doing among all these eminent Oxford/Cambridge graduates.	
369	End of tape IEA:STD-FH59 Side A	

Tape: IEA:SYD-FH59 Side B

001	Tape identification	
002	Main challenge on the Opera House construction was designing and building the erection arch. Bought the cranes in France.	Erection arch
023	Had to achieve 8200 psi strength concrete, twice as strong as normal concrete. Insisted on a slump of three inches and rounded river gravel and sand from Nepean River.	Wally Stinson Concrete slump Nepean River
070	Initially, it was thought to support the arches by a steel structure, but advised against that idea. Came up with the idea of the erection arch then.	Erection arch
086	Is incensed by a claim in the book 'UTZON' by Richard Weston that a Frenchman thought of the idea of the erection arch.	Book 'UTZON' by Richard Weston
094	Worked on cross sections of the concrete arch ribs in London. Concrete arch were meridians of a sphere. Explains the function of the erection arch, which he conceived in London with Arups.	
124	Utzon's order to Ralph Symonds, plywood manufacturers for plywood box beam trusses, 220 ft long and 4 inches apart, for an acoustic ceiling under the shells. Symonds was in receivership. Required special craneage under the shells to lift the plywood. The plywood plan was finally scuttled when Arups decided that the concrete beams in the orchestra pit were not strong enough to take the weight of all the plywood.	Ralph Symonds Sir William Davis Hughes Uncle Tom Cobbley DPWS
202	Anecdote about an acoustics expert, Professor Willie Jordan from Berlin University who tested a model of the Opera House for acoustics.	Professor Willie Jordan (Berlin University)
260	Problems with Utzon's jamming of the seats too close together so that people were sandwiched between seats.	
274	Utzon's 'Yellow Book' had no design detail - Arup filled it in. Arup's contribution was massive with over 300,000 man-hours more than contracted for spent on the project.	Sir Ove Arup Yellow Book
302	Major engineering challenge on the Opera House was that it was the first time anyone had match-cast and erected segments the way it was done.	

328	Anecdote about a talk on the Opera House he gave in Melbourne.	
	Construction budget – basis for estimate was “13,000 yards of concrete” – no drawings, no plans, no specifications!	Rider Hunt
399	End of Tape IEA:SYD-FH59 Side B	

Tape: IEA:SYD-FH60 Side A

001	Tape identification	
004	Arups were qualified and confident to take on the job.	
017	His main contribution was the invention of the erection arch and whole erection system, including use of a temporary stressing strand as construction tool.	
026	Ball joints were used on erection arch at top and bottom	Ball joints
037	Also designed special lifting tackle. Also cast a cone at the end of each segment to align with next one.	Special lifting tackle
053	Problems with unions. Jack Munday did more to delay the opening of the Opera House than any other person. DPWS directed that all workers should no longer receive the £2 per week over-award wages paid to them by Civil and Civic on Stage I, causing weekly stop work meetings and disruptions.	Mr Jack Munday Builders Labourers Union
083	How tiles were laid on the shell roofs. Tile panels of 'ferro cemento' as used in boat building - used galvanised mesh. Deformation problem of erected shells under the weight. Surveyor and Arup engineer solved the problem.	Hogana Factory Ferro Cemento Ron Bergen
157	A Sydney-based computer was used to perform calculations.	
167	Used cranes imported from France.	Paris Babcock White crane Lyons
209	Utzon's plan to have another shell within the shells as an acoustic shield - 'Gunite' blown on with compressed air.	
218	How he found out about Utzon's resignation. Had no idea it was about to happen. Thinks that Utzon miscalculated that his resignation would not be accepted.	David Littlemore Hall, Todd and Littlemore Bill Davis Hughes
254	All engineers were also foremen of their own division. Everyone started at 7:45am every morning, six days a week.	

279	Project after the Opera House. Hornibrooks, through its company, Australian Pipeline Construction, got half the tender on Moomba-Sydney pipeline. Was put in charge of the project, the great failure of his life. Admits that he did not have the expertise and technology to handle the project. Lived in the camp for weeks on end. Was under very high stress. Thinks that it may have contributed to the stroke he later had in 1995.	Australian Pipeline Construction Bass Strait oil fields Moomba-Sydney pipeline Carter Johnson Williams Bros Young, NSW Goulburn, NSW
351	The pipeline job was completed, but finished up in court.	
368	Pipe was supplied by the Pipeline Authority. The Japanese-manufactured pipe was welded together without difficulty, but the BHP-manufactured pipe had a different high-tensile steel and the welding rate per day dropped off, because the steel was hard to weld. The pipes were also found to be leaking. Production rates dropped off to 10 to 20% of what they should be. The case was settled out of court. Feels responsible for the company suffering the biggest loss in its history.	Pipeline Authority
437	Retired aged 63 at the end of the pipeline job.	
458	End of Tape IEA:SYD-FH 60 Side A	

Tape: IEA:SYD-FH60 Side B

001	Tape Identification	
002	Jobs between the completion of the Opera House and the pipeline job. Was always a director of Hornibrook Constructions. Was not getting any satisfaction from his work after the Opera House.	
017	His lives in his house at Avalon.	
023	Has not achieved what he set out to do. Has not measured up to his own standards of being an Engineer. His ten years in New Guinea also was not as successful as he had hoped it would be. Thinks that his contribution to the Opera House was not sufficient to compensate for other failures.	
041	Things that he would have done differently. Would not have put epoxy between the segments of the opera House construction because it was unnecessary and cost a lot extra.	Epoxy used on Opera House job
068	Feels that he should have spent a year in the Design Office after graduating.	
079	Made a bad choice during the war, flying Sunderlands in Coastal Command. Lost half of the crew during the 65 trips. After the tour, was sent to do a Bomber Leader's course in Lincolnshire and topped the course. Was asked to teach other navigators how to use a bomb site. Feels that he got off the war easily in Coastal Command and that he should have been sent to Bomber Command. Feels strong guilt that his entire crew were killed.	Sunderland Flying Boats Lincolnshire
130	Events of the war still haunt him. On Norman Gerrard's last trip, a young and inexperienced navigator was put on and feels that if he had been there, the plane may not have been shot down.	Norman Gerrard, Captain, Bombing Command.
166	Is not a religious person.	
181	The pipeline job was his greatest disappointment.	
204	Feels pride and some annoyance about the Opera House project in that Utzon never acknowledged the contribution of others. Is angry with him for not being more gracious.	
232	Ove Arup acknowledged his contribution to the Opera House. IEA gave him an Honorary Fellowship.	Institution of Engineers Australia
244	In New Guinea, built the Hydro-Electric Scheme for Port Moresby, an underground power station, a massive project which took two or three years to build. It was built during the Opera House days.	Hydro-Electric Scheme for Port Moresby

282	Of all projects, is most proud of the Opera House work – the highlight of his career. Sees former engineers on the Opera House job at organised lunches.	Jack Zunz
304	End of Tape IEA:SYD-FH60 and end of interview with Corbet Gore	